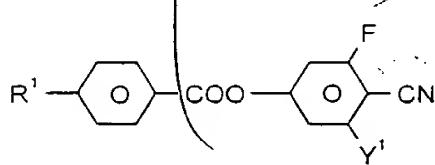


Patent Claims

SUB A 1.

An electro-optical liquid-crystal display comprising
5 a layer of liquid-crystal medium between two substrates with
alignment layers on inside surfaces of each of said substrates;
the liquid-crystal layer having a twist angle, from one substrate to the
other, of 110°-360°;
10 the liquid-crystal layer having a surface tilt angle of 2°-20°; and
each of said alignment layers having a thickness of 3 nm-150 nm.
15 2. A display according to claim 1, at least one of said alignment layers
has a layer thickness of 4 nm-60 nm.
3. A display according to claim 2, wherein the difference from 1 of the
steepness of the electric-optical characteristic line, represented by
20 the formula $V_{90}/V_{10}-1$, is half or less of the corresponding value of an
otherwise identical display in which the layer thicknesses of each of
the alignment layers is 100 nm.
25 4. A display according to claim 1, wherein the steepness of the electro-
optical characteristic line V_{90}/V_{10} is 1.06 or less.
5. A display according to claim 1, wherein the threshold voltage (V_{10}) of
the display is 1.20 V or less.
30 6. A display according to claim 1, wherein said liquid-crystal medium
comprises one or more compound(s) of formula I

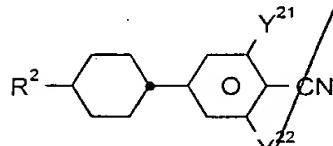


wherein

5 R¹ is alkyl having 1 to 7 carbon atoms, alkoxy having 1 to 7
carbon atoms, alkoxyalkyl having 2 to 7 carbon atoms, alkenyl
having 2 to 7 carbon atoms or alkenyloxy having 2 to 7 carbon
atoms, and

10 Y¹ is H or F.

15 7. A display according to claim 1, wherein said liquid crystal medium
comprises at least one compound of formula II



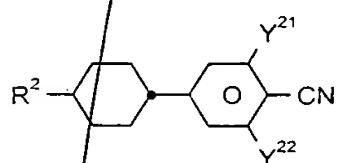
II

20 wherein

25 R² is alkyl having 1 to 7 carbon atoms, alkoxy having 1 to 7
carbon atoms, alkoxyalkyl having 2 to 7 carbon atoms, alkenyl having
2 to 7 carbon atoms or alkenyloxy having 2 to 7 carbon atoms, and

30 Y²¹ and Y²² are each, independently, H or F.

35 8. A display according to claim 6, wherein said liquid crystal medium
comprises at least one compound of formula II



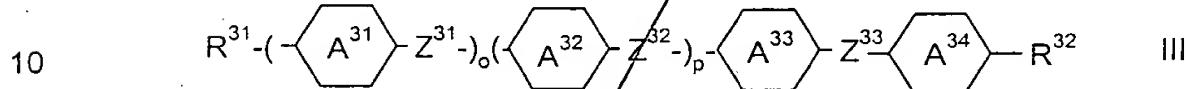
II

35 wherein

R² is alkyl having 1 to 7 carbon atoms, alkoxy having 1 to 7 carbon atoms, alkoxyalkyl having 2 to 7 carbon atoms, alkenyl having 2 to 7 carbon atoms or alkenyloxy having 2 to 7 carbon atoms, and

5 Y²¹ and Y²² are each, independently, H or F.

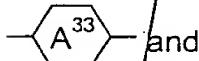
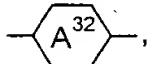
9. A display according to claim 6, wherein said liquid crystal medium comprises at least one compound of formula III



wherein

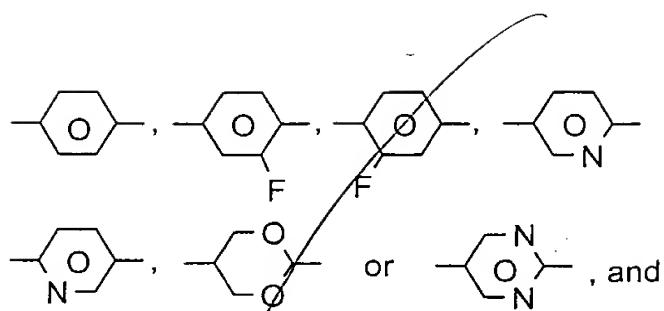
15 R³¹ and R³² are each, independently of one another, alkyl having 1 to 7 carbon atoms, alkoxy having 1 to 7 carbon atoms, alkoxyalkyl having 2 to 7 carbon atoms, alkenyl having 2 to 7 carbon atoms, or alkenyloxy having 2 to 7 carbon atoms, and

20 Z³¹, Z³² and Z³³ are each, independently of one another, -CH₂CH₂-, -CH=CH-, -COO- or a single bond,



30 $\text{--A}^{34}\text{--}$ are each, independently of one another, $\text{--}\text{C}_6\text{H}_{11}\text{--}$,

35

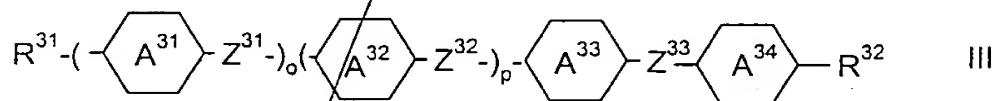


o and p, independently of one another, are 0 or 1.

10

10. A display according to claim 7, wherein said liquid crystal medium comprises at least one compound of formula III

15



wherein

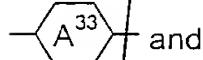
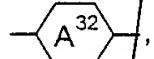
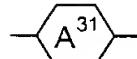
20

R³¹ and R³² are each, independently of one another, alkyl having 1 to 7 carbon atoms, alkoxy having 1 to 7 carbon atoms, alkoxyalkyl, having 2 to 7 carbon atoms, alkenyl having 2 to 7 carbon atoms, or alkenyloxy having 2 to 7 carbon atoms, and

25

Z³¹, Z³² and Z³³ are each, independently of one another, -CH₂CH₂-, -CH=CH-, -COO- or a single bond,

30



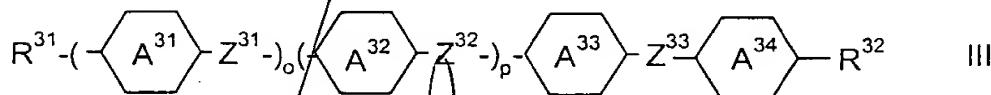
35



——, —— or ——, and

σ and p , independently of one another, are 0 or 1.

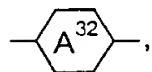
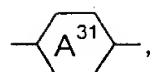
11. A display according to claim 8, wherein said liquid crystal medium comprises at least one compound of formula III



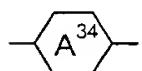
wherein

R^{31} and R^{32} are each, independently of one another, alkyl having 1 to 7 carbon atoms, alkoxy having 1 to 7 carbon atoms, alkoxyalkyl, having 2 to 7 carbon atoms, alkenyl having 2 to 7 carbon atoms, or alkenyloxy having 2 to 7 carbon atoms, and

Z^{31} , Z^{32} and Z^{33} are each, independently of one another, - CH_2CH_2 -, - $\text{CH}=\text{CH}$ -, - COO - or a single bond,

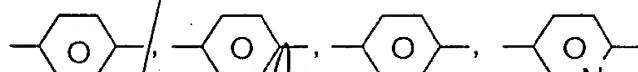


c1ccccc1A33 and

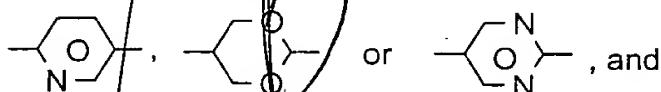


are each, independently of one another, *c1ccccc1*,

10



15



o and p, independently of one another, are 0 or 1.

20

12. In a method of displaying information using an electro-optical liquid-crystal display, the improvement wherein said display is one in accordance with claim 1.

25

Add
A2

30

35